

Plum Pox

Plum pox potyvirus (PPV), also known as sharka, is the most devastating viral disease of stone fruit worldwide. PPV severely reduces fruit yield and quality, rendering fruit that is blemished and unmarketable. Stone fruit species—or members of the genus *Prunus*—that are susceptible to plum pox, include almonds, apricots, cherries, nectarines, peaches, and plums, among others. PPV can also infect wild and ornamental *Prunus* varieties, such as Korean cherry (a.k.a., flowering almond or oriental bush cherry), black cherry (a.k.a., rum cherry or mountain black cherry), and American wild plum.

There are six known strains of PPV: D, M, EA, C, W, and PPV-Rec (Recombinant). PPV-D and PPV-M are the most widely distributed strains of plum pox worldwide. And, while both of these strains can infect peach, nectarine, plum, and apricot, M is much more aggressive in peach and spreads rapidly in orchards via aphids. PPV-M is also the only strain reported to transmit the virus through seed. To date, PPV-D is the only strain detected in the United States.

History of the Plum Pox Virus

First described on plums in Bulgaria in 1915, PPV has spread throughout Europe, the Mediterranean, the Middle East (Egypt and Syria), India, and Chile. In Europe, PPV has infected more than 100 million stone fruit trees. The first documented case of plum pox in North America was detected in a Pennsylvania orchard in 1999. The following year, Canadian officials detected PPV in Ontario. In 2006, subsequent U.S. detections were made in New York and Michigan.

The establishment and unmitigated spread of PPV in the United States could not only jeopardize the nearly \$1.4 billion U.S. stone fruit industry, but also diminish commercial nursery production and residential stone fruit yields and quality, as well.

Plum Pox Symptoms

While yellow or brown blotches or rings on the leaves or fruit of *Prunus* plants are notable characteristics of plum pox, there are a number of other symptoms that may appear, including: severely deformed and bumpy fruit; leaf distortion and drop; and deformed, discolored seeds. Because infected *Prunus* trees exhibit such a wide range of leaf, flower, and fruit symptoms, educating survey crews, diagnosticians, growers, and nurserymen about the broad range of PPV symptoms is crucial to detecting plum pox.

In peach, for example, PPV-infected trees may exhibit color-breaking symptoms in the blossoms. This appears as darker pink stripes on the flower petals and can be useful for early season surveys. PPV symptoms can be present in young leaves in the spring and on the surface of developing fruit. Symptoms can persist on mature leaves and fruit, as well.

Sometimes, infected trees display no symptoms on the leaves or fruit at all. In Chile and Pennsylvania, scientists discovered numerous, symptom-free orchards infected with PPV. Because these orchards were asymptomatic, scientists could not confirm the presence of virus in the trees until they had conducted a battery of rigorous laboratory tests.

Spread of Plum Pox

Plum pox is most commonly spread over relatively short distances by aphids (i.e., plant lice), tiny plant-feeding insects that transmit the disease while feeding. Aphids serve as vectors for the virus' spread by sucking sap from PPV-infected plants and transferring the virus to uninfected plants. At least 20 different aphid species (including *Myzus persicae*, *Aphis spiraeicola*, *A. gossypii*, and *A. fabae*) can transmit PPV throughout an orchard and to other trees in nearby orchards, forests, and residential areas. Long-distance spread of PPV typically results from moving infected nursery stock or propagative materials.

While several aphid species can spread the virus, not all of the PPV variants can be transmitted by aphids. The successful transmission of the PPV also depends on the length of time the virus remains viable on an aphid's mouthparts.

Control

Control and prevention measures for PPV include field surveys (delimiting and detecting); use of only disease-free (certified) nursery materials and virus-resistant plants; control of aphid populations; and the removal of nurseries, orchards, and host plants in residential areas that are infected with plum pox.

Sources of resistance exist in *Prunus* but are not abundant. A team of U.S. and French scientists genetically engineered a PPV-resistant plum (referred to as C5) that, through hybridization, has been shown to transfer its PPV resistance to other plum trees. This PPV resistant plum is now known as the cultivar 'Honey Sweet.' The Animal and Plant Health Inspection Service deregulated this cultivar in 2007. Honey Sweet plum now provides a unique source of germplasm for future breeding programs worldwide.

Scientists have yet to achieve similar success in attempts to breed PPV resistance into other *Prunus* species.

Economic Importance of Plum Pox

Plum pox is economically important because it causes fruit to be unmarketable and it weakens infected trees and decreases fruit yield. The presence of PPV can also enhance the damaging effects and increase the economic losses caused by other endemic viruses infecting various species of the genus *Prunus*. These include the prune dwarf virus, *Prunus* necrotic ringspot virus (causes browning), and apple chlorotic leaf spot virus (causes yellowing).

In southeastern France, the newly identified strain of PPV, PPV-Rec induces severe necrosis, resulting in early leaf drop and tree decline (even in the absence of endemic *Prunus* viruses). The severity of the disease depends on the strain of the virus present and the susceptibility of the infected *Prunus* cultivars (cultivated varieties of plants) and species. The results from a wide-scale outbreak of PPV could lead to a decrease in stone fruit exports and higher prices for domestic consumers.

How You Can Help

If you notice any signs of plum pox in your orchard or *Prunus* trees, fruit, or leaves, please immediately contact your county agricultural extension agent or one of the appropriate government agencies listed below.

For more information about plum pox, you can visit our Web page at http://www.aphis.usda.gov/plant_health/plant_pest_info/plum_pox/index.shtml.

Plum Pox Virus Eradication Program National Coordinator:

USDA-APHIS-PPQ
Plum Pox Virus Eradication Program
401 East Louther Street, Suite 102
Carlisle, PA 17013
Telephone: (717) 241-0705
Toll-Free: (800) 249-2363
Fax: (717) 241-0718

Pennsylvania:

Pennsylvania Pathology and Virology Division
Attn: Plant Lab
2301 North Cameron Street
Harrisburg, PA 17110-9408
Telephone: (717) 772-5222
Fax: (717) 705-6518

Michigan:

USDA-APHIS-PPQ
Plum Pox Virus Eradication Program
Michigan Field Office
4032 M-139, Room 124
Saint Joseph, MI 49085
Telephone: (269) 408-0976
Fax: (269) 408-1391

Michigan Department of Agriculture, Region 5
4032 M-139, Room 116
Saint Joseph, MI 49085
Telephone: (269) 428-2546

New York:

USDA-APHIS-PPQ
Plum Pox Virus Eradication Program
New York Field Office
23 Elizabeth Drive
Lockport, NY 14094
Telephone: (716) 433-6482 Ext. 200
Fax: (716) 433-6593

New York State Department of Agriculture and Markets
Division of Plant Industry
10-B Airline Drive
Albany, NY 12235-0001
Telephone: (518) 457-2087
Toll-Free: (800) 554-4501

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.